COMMUNICATIONS STANDARDS

updated for version 6.0.0.

July 31, 1998

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INTRODUCTION

Scope of Standards

These standards define the requirements for communicating with EDS's ELIT (ELectronic Information Transfer) file transfer network via its binary synchronous interface. They also describe optional services available on the network and how to request or invoke them.

Requests for copies or for further clarification of these Standards should be directed to:

ELIT Engineering & Services
Electronic Data Systems Corporation
Mail Stop 4126
800 Tower Drive
Troy, MI 48098

Hardware / Software Requirements

The standards are designed with the intention that the use of specific hardware or software is neither implicitly required, encouraged, discouraged, or precluded. The standards are, however, based on the line control procedures outlined in the IBM system reference library publication entitled General Information - Binary Synchronous Communications (GA27-3004). A copy of this publication is recommended as an appendix of this standard. The hardware devices selected must be capable of compatible operation with any other device(s) as outlined in this publication. The sending party is responsible to be aware of the relevant hardware characteristics (such as line speed, line type, modem type, line protocol, etc.) of the receiving location.

ELIT Standards Information

This document was prepared and updated for users communicating with ELIT V6R0M0. There have been several changes for this release, particularly the expansion of up to 17 character location codes. As of this date, no site will change location codes and will remain with their original 3 letter location code. Present users will be able to communicate with ELIT in the usual manner, if desired. If communicating with a location with more than 3 characters, please pay attention to the "revised" headers and trailers section. If you need to know the release level of the ELIT you are presently communicating or plan to begin communicating, ask your contact in ELIT Administration or at the ELIT Help Desk.

Communications

Communication Session Flow

Description of what follows;

REF. NUMBER	CALLER		RECEIVER	
1	*HDR caller/password	===>		ELIT proprietary logon header
2		<===	ACK	
3	*THS file specs.	===>		ELIT proprietary source header
4		<===	ACK	
5	*THD destination	===>		ELIT proprietary destination header
6		<===	ACK	
7	data block	===>		
8		<===	ACK	
9	*TTR control info.	===>		ELIT proprietary message trailer
10		<===	ACK	
11	EOT	===>		
12		<===	ENQ	
13	ACK	===>		
14		<===	*THS file specs.	ELIT proprietary source header
15	ACK	===>		
16		<===	*THD destination	ELIT proprietary destination header
17	ACK	===>		
18		<===	data block	
19	ACK	===>		
20		<===	*TTR control info.	ELIT proprietary message trailer
21	ACK	===>		
22		<===	DLE EOT	

Notes:

- 5 through 6 may be repeated for up to 299 destinations.
- 7 through 8 may be repeated for up to 249 additional data blocks or until the entire file is sent, whichever is less. See next page for further clarification.
- 9 through 10 may be repeated for up to 4 additional switchers that have switched the data.
- 3 through 10 may be repeated until the caller has sent all data to the receiver.
- 16 through 17 may be repeated for up to 299 destinations.
- 18 through 19 may be repeated for up to 249 additional data blocks or until the entire file is sent, whichever is less. See next page for further clarification regarding message interruption.
- 20 through 21 may be repeated for up to 4 additional switchers that have switched the data.
- 14 through 21 may be repeated until the receiver has sent all data to the caller.
- example follows on pages 4 - 6.
- for line turnaround (or picking up files without sending in files) see example on page 7.

Transmission File Structure

In an ELIT communication session, following the logon, one or more data files may be transmitted. Data files are transmitted as one or more messages. Each message contains 250 data blocks, which equal 250,000 bytes of data. Transmitting a data file as multiple messages allows interrupted communications to be resumed without re-sending that part of the data file that was already sent. Messages contain control information followed by all or part of the data file. Many transmission scenarios are possible, for example:

One Data File sent in one Message

a) Control Information Headers

b) Data File

c) Control Information Trailer

One Data File sent in two Messages

a) Control Information Headers

b) First part of Data File

c) Control Information Trailer

d) Control Information Headers

e) Second part of Data File

f) Control Information Trailer

Two Data Files, one sent in three Messages, one sent in one Message

a) Control Information Headers

b) First part of Data File 1

c) Control Information Trailer

d) Control Information Headers

e) Second part of Data File 1

f) Control Information Trailer

g) Control Information Headers

h) Third part of Data File 1

i) Control Information Trailer

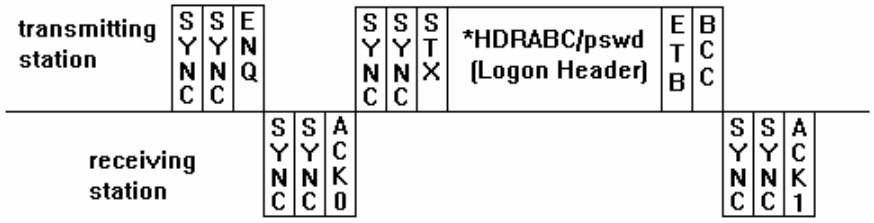
j) Control Information Headers

k) Data File 2

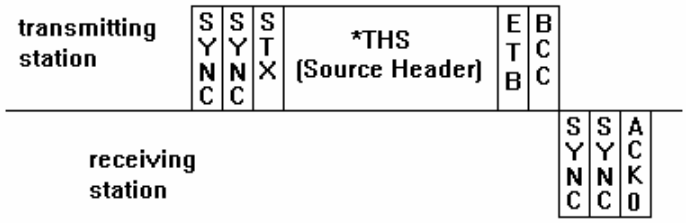
l) Control Information Trailer

Bisync Line Control Format

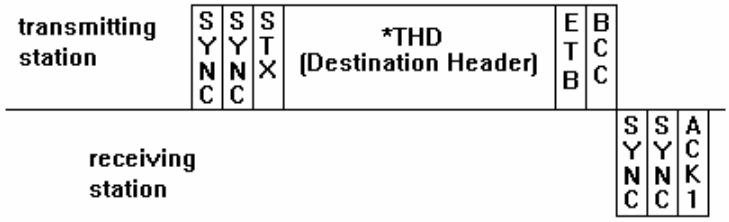
Bisync Line Control Format Examples



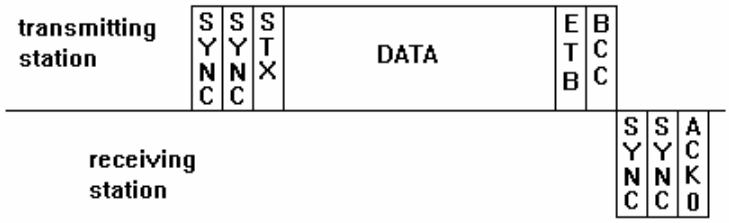
To send to EDS*ELIT, transmission headers are required. Above is an example of a transmission session with the source 'ABC'. ABC bids for the line with an ENQ and ELIT ACKs the bid. The first record (the *HDR or LOGON HEADER) must be the ONLY record in the block. Upon receiving the valid block, ELIT will respond with alternating ACK0s and ACK1s. Once the LOGON HEADER is received, the password is checked for validity. If valid, the session continues, if not it is terminated.



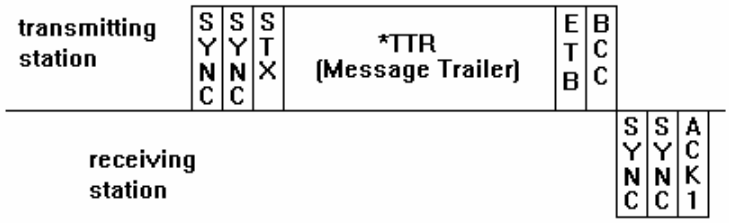
Continuing, the transmitting location (ABC) would send the *THS record in the second block. ELIT will respond with an ACK to the valid block. The *THS defines source controlled parameters such as source ID, blocking format and size.



After receiving the *THS record and subsequent blocks of data do not match the parameters defined in the *THS, an error will occur and the session will be terminated. The *THD record follows next and will provide information on the final destination of the file. (the destination code)

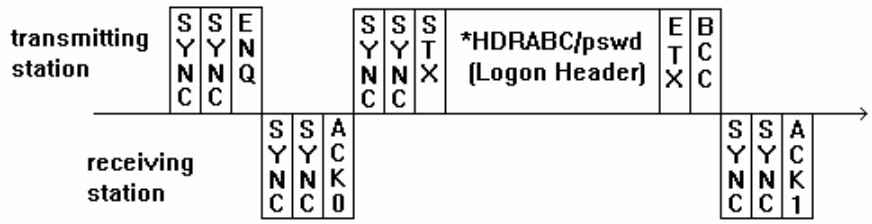


After receipt of a valid *THD header record, the next transmission block is comprised of the file's data text. There can be multiple blocks of data, as many as the file requires. ELIT will continue responding with alternate ACK0 s & ACK1s to valid data blocks. After all the data for this file has been sent, the *TTR trailer record is required.

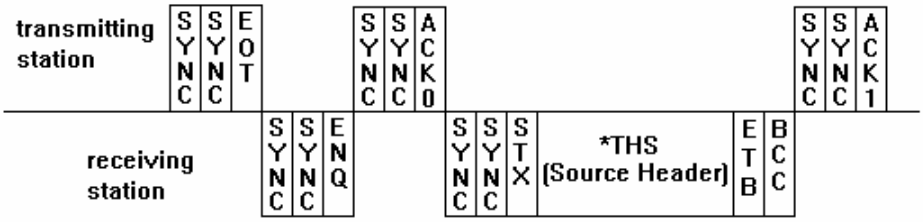


The *TTR signifies the end of the file and MUST be in it's owns transmission block. The sending station may then terminate the session by sending the DLE EOT character string.

Bisync Line Control Turnaround Example



To initiate line turnaround, the sending party should send an EOT after the receiving side has ACK'd the *HDR record. The receiving station (ELIT) will then enqueue the transmitting station. Once ACK'd, the receiving station will begin to send data, starting with the *THS record.



Headers and Trailers

In order to identify files, senders and receivers, and to provide access security, ELIT requires that specific control information be provided by the sender. The control information is provided in the form of header and trailer records which "envelope" the data files. The "Log-on" Header (*HDR) will start each session. Each message will start with a Source Header (*THS) and one or more Destination Headers (*THD), and be followed by a Message Trailer (*TTR).

Prior to ELIT V6R0M0, each ELIT location was identified by a 3 character alpha numeric code. In ELIT V6R0M0, additional codes were established which are up to 17 characters in length. ELIT header and trailer formats have been revised to accommodate the longer location codes, but the original formats continue to be supported. **The original formats can only be used when both the sender and receiver are identified by 3 character codes. The revised formats can be used for any sender and any receiver**. The original and revised headers and trailers are described below.

Log-On Header (*HDR) (Original Format with example)

The Log-On Header is required to identify the calling party to the called party on all dial-up connections. It is optional for dedicated line connections. The identity of the calling party is verified by the use of a password. The Log-On Header contains the following: "(R)" refers to a REQUIRED field

Description	Content	Positions
Log-On Header Identifier: Identifies this record as a log-on header. (R)	*HDR	1 - 4
Caller's ELIT Location Code: The ELIT location code of the caller. (R)	3 alpha numeric	5 - 7
Delimiter: A delimiter character to indicate that a password follows. (R)	/	8
Old or Current Password: A five character non-blank password established by the calling party. (R)	5 alpha numeric	9 - 13
Delimiter: A delimiter character to indicate that the password is being changed. A blank indicates that the password is not being changed.	/ or blank	14
New Password: A five character password to replace the old password (indicated by '/' in position 14). Only upper case alphabetic and numeric characters are permitted. It may not be the same as the old password.	5 alpha numeric or blank	15 - 19
Reserved: for use by ELIT Administration	Blank	20 - 80

Example

*HDRABC/PSWRD	logon with password "PSWRD"
*HDRABC/PSWRD/NEWPW	logon with password change to "NEWPW" from "PSWRD"

NOTE: The three letter location code, ABC in these examples, that is defined in the *HDR in cols. 5-7 must also match the *THS and *TTR records in columns 5-7. If not, the transmission will be terminated by ELIT.

Source Header (*THS) (Original Format with example)

One Source Header precedes each message. It identifies the originator of the data file, and provides information about the characteristics of the files such as its name, format, and logical record length. The Source Header contains the following: "(R)" refers to a REQUIRED field

Description	Content	Positions
Source Header Identifier: Identifies this record as a Source Header. (R)	*THS	1 - 4
Source Code: The ELIT Location Code of the originator of this file. (R)	3 alpha numeric	5 - 7
Sequence Number: A sequence number assigned to the file by the originator. It may be used to provide an audit trail of files sent to each destination. Typically, the first file of the day is numbered 0001, the second 0002, etc., with the number being reset each day. If sequence numbering is not used, this field should contain 0001. (R)	4 numeric	8 - 11
Priority Code: Inserted by the originator to indicate the priority this file should be given in any priority queues. The values from highest priority to lowest are: F (Feedback), O (Operator Rush), 1, 2 or R (Rush), 3, 4, and 5 or N (Normal). Any other value will be considered a N (normal) priority.	1 alpha numeric	12
Reserved	5 blank	13 - 17
Format Code: A code to indicate the structure/format characteristics of the file (refer to Format Codes chapter). (R)	2 numeric	18 - 19
Record Length: The length in bytes of the logical records of this file (refer to Format Codes chapter). (R)	4 numeric	20 -23
Block Length: The length in bytes of the transmitted physical blocks of this file (refer to Format Codes chapter). (R)	4 numeric	24 - 27
Reserved	1 blank	28
Filename: A name assigned to the file by the originator to identify it within the ELIT network, usually agreed upon by both the originator and the recipient. (R)	10 alpha numeric	29 - 38

Continuation Number: This represents the number of the message within a multi-message file. This field should contain 01 for single-message files. If a file contains more than 99 messages, see Continuation Number - Hundreds Digit. (R)	2 numeric	39 - 40
Continuation Number - Hundreds Digit: Required for the high-order (leftmost) digit of Continuation Number **if** it exceeds 99. Is blank if files contains less than 100 messages.	1 numeric or blank	41
Time Created: The time this file was sent by the originator. Format is hhmm.	4 numeric	42 - 45
Date Created: The date this file was sent by the originator. Format is mmdd.	4 numeric	46 - 49
Application Control Reference: An identification assigned to the file by the originator which may be used to differentiate between files having the same Filename.	5 alpha numeric	50 - 54
Reserved	5 blank	55 - 59
Feedback Request Filename: Indicates the filename to be used for a Feedback File which will be sent to the originator of this file (refer to Feedback chapter). If no filename is specified (field is blank), feedback is not requested.	10 alpha numeric or blank	60 - 69
Access Code: Accounting field used for ELIT billing. (not required for dial-up)	6 alpha numeric	70 - 75
Reserved	5 blank	76 - 80

Example

*THSABC00015bbbbb0200800080bTESTFILE9701bbbbbbbbbbbb-to column 80 ("b" is a blank)

NOTE: The three letter code, in this example ABC, in the *THS record in columns 5 - 7 must match with the *HDR and the *TTR record. Otherwise, ELIT will terminate the transmission.

NOTE: The Sequence Number in columns 8 - 11 must match Sequence Number in the *TTR record. Otherwise, ELIT will terminate the transmission

Destination Header (*THD) (Original Format with example)

One or more Destination Headers precedes each message. They identify the intended recipient of the data file. Up to 300 Destination Headers can be used to send the data file to multiple recipients. The Destination Header contains the following: "(R)" refers to a REQUIRED field

Description	Content	Positions
Destination Header Identifier: Identifies this record as a Destination Header. (R)	*THD	1 - 4
Destination Code: The ELIT Location Code of the recipient of this file. (R) Multiple *THD records are used to specify more than one recipient of a file. Maximum destinations are 300.	3 alpha numeric	5 - 7
Reserved	71 blanks	8 - 78
End of Destination Header Indicator: Indicates that this Destination Header is the last (or only) Destination Header. (R)	@	79
Reserved	1 blank	80

Example

*THDCNP @ (column 79 has "@")

Message Trailer (*TTR) (Original Format with example)

One Message trailer follows each message. It indicates the end of a message and provides control information necessary for reliable file transfer. The Message Trailer contains the following: "(R)" = REQUIRED field

Description	Content	Positions
Message Trailer Identifier: Identifies this record as a Message Trailer. (R)	*TTR	1 - 4
Source Code: The ELIT Location Code of the originator of this file. (R)	3 alpha numeric	5 - 7
Sequence Number: A sequence number assigned to the file by the originator. It may be used to provide an audit trail of files sent to each destination. Typically, the first file of the day is numbered 0001, the second 0002, etc., with the number being reset each day. If sequence numbering is not used, this field should contain 0001. (R)	4 numeric	8 - 11
Physical Block Count: The number of data blocks transmitted in the message. It does not include header and trailer blocks. The receiver of a message should reconcile this count with the number of data blocks actually received.	5 numeric	12 - 16
End-of-File Indicator: A "1" indicates end of message but not end of data file; A "2" indicates both end of message and end of data file. (R)	1 numeric	17
Format Code: A code to indicate the structure/format characteristics of the file (refer to Format Codes chapter). (R)	2 numeric	18 - 19
Block Length: The length in bytes of the transmitted physical blocks of this file (refer to Format Codes chapter).	4 numeric	20 - 23
Time Received: The time this file was received. The format is "hhmm" with a range of 0000 to 2359.	4 numeric	24 - 27
Date Received: The date this file was received. The format is "mmdd".	4 numeric	28 - 31
Next Location Code: the ELIT Location Code to where this data file is directed. It may indicate the recipient (final destination) or an intermediate location (switcher). (R)	3 alpha numeric	32 - 34

Time Transmitted: The time this file was transmitted. The format is "hhmm" with a range of 0000 to 2359.	4 numeric	35 - 38
Date Transmitted: The date this file was transmitted. The format is "mmdd".	4 numeric	39 - 42
Suspected Duplicate Code: A "1" indicates there is reason to believe that this message is a duplicate of one previously sent or received. A "0" indicates no suspected duplication. (supplied by ELIT)	1 numeric	43
Logical Record Count: The number of logical records in this message.	7 numeric	44 - 50
Reserved	8 numeric	51 - 58
Greenwich Mean Time Differential: A value from "00" to "11" to indicate the number of hours the times in this control record are offset from Greenwich Mean Time.	2 numeric	59 - 60
Reserved:	10 blank	61 - 70
File Control Number: A control number dynamically assigned to this file by the ELIT network.	9 numeric	71 - 79
Reserved	1 blank	80

Example

*TTRABC0001bbbbb2020080bbbbbbbbBDSbbbbbb-to column 80 ("b" is a blank. BDS is next location)

NOTE: If the block count and / or record count in columns 12-16 or 44-50 is blank, EDS*ELIT will not verify the true physical block count or the logical record count. EDS*ELIT will read the actual block count and / or record count and insert these values into these fields.

NOTE: The three letter code, in this example ABC, in the *TTR record in columns 5 - 7 must match with the *HDR and the *THS records. Otherwise, ELIT will terminate the transmission.

NOTE: The Sequence Number in columns 8 - 11 must match the Sequence Number in the *THS record. Otherwise, ELIT will terminate the transmission.

Log-On Header (*HDR) (Revised Format with example)

The Log-On Transmission Header is required to identify the calling party to the called party on all dial-up connections. It is optional for dedicated line connections. The identity of the calling party is verified by the use of a password. The Log-On Header contains the following: "(R)" refers to a REQUIRED field

Description	Content	Positions
Log On Indicator: Identifies this record as a log-on header. (R)	*HDR	1 - 4
Calling Station ID Code: The Source Destination Code assigned to the station initializing the call. These codes are assigned by EDS* ELIT Administration. (R)	3 - 17 alpha numeric	5 - 21
Delimiter: A delimiter character to indicate that a password follows. (R)	/	22
Old or Current Password: A five character non-blank password established by the calling party. (R)	5 alpha numeric	23 - 27
Delimiter: A delimiter character to indicate that the password is being changed. A blank indicates that the password is not being changed.	/ or blank	28
New Password: A five character password to replace the old password (indicated by '/' in position 28). Only upper case alphabetic and numeric characters are permitted. It must be not be the same as the old password.	5 alpha numeric or blank	29 - 33
Reserved: for use by ELIT Administration	Blank	34 - 80

Example

*HDRABCDEFGHIJ1234567/PSWRD logon with password "PSWRD"
*HDRABCDEFGHIJ1234567/PSWRD/NEWPW logon with password change to "NEWPW"

Source Header (*THS) (Revised Format with example)

One Source Header precedes each message. It identifies the originator of the data file and provides information about the characteristics of the files such as its name, format, and logical record length. The Source Header contains the following: "(R)" refers to a REQUIRED field

Description	Content	Positions
Start of Message Header Indicator: The indicator will identify this record as a Message Header. (R)	*THS	1 - 4
Reserved	3 blank	5 - 7
Sequence Number: A sequence number assigned to the file by the originator. It may be used to provide an audit trail of files sent to each destination. Typically, the first file of the day is numbered 0001, the second 0002, etc., with the number being reset each day. If sequence numbering is not used, this field should contain 0001. (R)	4 numeric	8 - 11
Reserved	6 blank	12 - 17
Format Code: A code to indicate the structure/format characteristics of the file. (refer to Format Codes chapter) (R)	2 numeric	18 - 19
Record Length: The length in bytes of the logical records of this file (refer to Format Codes chapter). (R)	4 numeric	20 -23
Block Length: The length in bytes of the transmitted physical blocks of this file. (refer to Format Codes chapter). (R)	4 numeric	24 - 27
Reserved	1 blank	28
Filename: A name assigned to the file by the originator to identify it within the ELIT network. (R)	10 alpha numeric	29 - 38
Continuation Number: This represents the number of the message within a multi-message file. This field should contain 01 for single-message files. If a file contains more than 99 messages, see Continuation Number - Hundreds Digit (R)	2 numeric	39 - 40

Continuation Number - Hundreds Digit: Required for the high-order (leftmost) digit of Continuation Number if it exceeds 99. May be blank if files contains less than 100 messages.	1 numeric or blank	41
Reserved	16 blank	42 - 56
Revised Header Indicator: An "R" indicates that this is a "Revised"-type header (R)	1	57
Reserved	2 blank	58 - 59
Feedback Request Filename: Indicates the filename to be used for a Feedback File which will be sent to the originator of this file (refer to Feedback chapter). If no filename is specified (field is blank), feedback is not requested.	10 alpha numeric or blank	60 - 69
Reserved	11 blank	70 - 80

Example

*THSbbb0001bbbbbb0200800080bTESTFILE9601bbbbbbbbbbbbbbbbRb-to column 80 ("b" is a blank)

NOTE: The Sequence Number in columns 8 - 11 must match Sequence Number in the *TTR record. Otherwise, ELIT will terminate the transmission.

Destination Header (*THD) (Revised Format with example)

One or more Destination Headers precedes each message. They identify the intended recipient of the data file and in some cases may be used to identify the original source of the data file. Up to 300 Destination Headers can be used to send the data file to multiple recipients. The Destination Header contains the following:

Description	Content	Positions
Start of Destination Header Indicator: The indicator will identify this record as a Destination Header. (R)	*THD	1 - 4
Destination Code: The ELIT Location Code of the recipient of this file. (R)	3 - 17 alphanum	5 - 21
Source Code: The ELIT Location Code of the originator of this file. This is not a required field. However, if used it must match the 3 -17 character location code specified in columns 5 - 21 in the Revised Log-on Header record. (*HDR) (Only valid on first *THD record)	3 - 17 alpha numeric	22 - 38
Deliver-After Date: MMDDYYYY Date in which to deliver file after.	8 alpha	39 - 46
Deliver-After Time: HHMM Time in which to deliver file after.	4 numeric	47 - 50
Deliver-Before Date: MMDDYYYY Date in which to deliver file before.	8 alpha	51 - 58
Deliver-Before Time: HHMM Time in which to deliver file before.	4 numeric	59 - 62
Deliver-Before Code: A = Always deliver. B = Don't deliver late.	1 alpha	63
Reserved	14 blank	64 - 78
End of Destination Header Indicator: Indicates that this Destination Header is the last (or only) Destination Header. (R)	@	79
Reserved	1 blank	80

Example

*THDZYXWVUTSRQ7654321BDSbbbbbbbbbbbbbbbbbbbbbbbbb-to column 78@b ("b" is a blank)

Message Trailer (*TTR) (Revised Format with example)

One Message trailer follows each message. It indicates the end of a message and provides control information necessary for reliable file transfer. The Message Trailer contains the following:

"(R)" refers to a REQUIRED field

Description	Content	Positions
Start of Message Trailer Indicator: The indicator will identify this record as a Message Trailer. (R)	*TTR	1 - 4
Reserved	3 blank	5 - 7
Sequence Number: A sequence number assigned to the file by the originator. It may be used to provide an audit trail of files sent to each destination. Typically, the first file of the day is numbered 0001, the second 0002, etc., with the number being reset each day. If sequence numbering is not used, this field should contain 0001. (R)	4 numeric	8 - 11
Physical Block Count: The number of data blocks transmitted in the message. It does not include header and trailer blocks. The receiver of a message should reconcile this count with the number of data blocks actually received..	5 numeric	12 - 16
End-of-File Indicator: A "1" indicates end of message but not end of data file; A "2" indicates both end of message and end of data file (R)	1 numeric	17
Format Code: A code to indicate the structure/format characteristics of the file (refer to Format Codes chapter). (R)	2 numeric	18 - 19
Block Length: The length in bytes of the transmitted physical blocks of the file. (refer to Format Codes chapter)	4 numeric	20 - 23
Time Message Received: The time this file was received. The format is "hhmm" with a range of 0000 to 2359.	4 numeric	24 - 27
Date Received: The date this file was received. The format is "mmdd".	4 numeric	28 - 31
Next Location Code: the ELIT Location Code to which this data file is directed. It may indicate the recipient (final destination) or an intermediate location (switcher). (R)	3 alpha numeric	32 - 34

Time Transmitted: The time this file was transmitted. The format is "hhmm" with a range of 0000 to 2359.	4 numeric	35 - 38
Date Transmitted: The date this file was transmitted. The format is "mmdd".	4 numeric	39 - 42
Date Created: The date this file was sent by the originator. Format is "mmdd".	1 blank	43
Logical Record Count: Logical number logical records in this message.	7 alpha numeric	44 - 50
Reserved	30 blank	51 - 80

Example

*TTRbbb0001bbbbb2020080bbbbbbbbbbbbbbbb-to column 80 ("b" is a blank)

NOTE: If the block count and / or record count in columns 12-16 or 44-50 is blank, EDS*ELIT will not verify the true physical block count or the logical record count. EDS*ELIT will read the actual block count and / or record count and insert these values into these fields.

NOTE: The Sequence Number in columns 8 - 11 must match Sequence Number in the *THS record. Otherwise, ELIT will terminate the transmission.

Format Codes

General

EDS ELIT makes decisions on formatting and reformatting based on information found in the location table. EDS ELIT always selects the most efficient format code that it can use based on the constraints put on it by the path it must take. When messages are routed through switchers, (intermediate sites) it is possible that the switcher may decide to reformat the message based on information found in its location table. The home location considers the path a message will follow and plans its formatting strategy accordingly.

Format Code Types

00	Fixed, Variable and Undefined length records that are able to span transmission blocks and messages. No constraints on record lengths.
01	Fixed length, unblocked records. Record length limited to <= location's maximum transmission block length.
02	Fixed length, blocked records. Record length limited to <= location's maximum transmission block length.
03	Variable length blocked records. Record length limited to <= location's maximum transmission block length.
04	Variable length, unblocked records. Record length limited to <= location's maximum transmission block length.
05	Teletype start / stop sending format. Records may span a single transmission block, but cannot be larger than 2000 bytes. Records cannot span messages.
06	Fixed, Variable and Undefined length records that are able to span transmission blocks and messages. No constraints on record lengths.
07	Fixed/Variable blocked records. Record length limited to <= location's maximum transmission block length.
08	Fixed/Variable unblocked records. Record length limited to <= location's maximum transmission block length.

Dial-Up Line Control Procedure

EDS ELIT LOCATION PROFILE

All locations wishing to send messages using EDS ELIT must first fill out and mail / fax the " EDS ELIT LOCATION PROFILE FORM" to the ELIT Administration group. This form defines the characteristics of the user's hardware and software. An example is on the following page. The following information will be helpful in completing the form:

1. CUSTOMER CODE: Location Code as assigned by EDS ELIT Administration.

2. TYPE of CONNECTION: Synchronizing techniques supported:
- Binary synchronous (BSC)
- Systems Network Architecture (SNA)
- ASYNC
- Remote Spooling Communications System (RSCS)

3. MODEM SPEED:
   - 2400 baud must be 201C compatible
   - 4800 baud must be 208B compatible
   - 9600 baud must be V.32 compatible

4. PROTOCOLS:
- 2780
- 3780

5. MAXIMUM BLOCK SIZE:
   Maximum size of transmission block. May be between 80 - 1000 bytes.

6. ELIT NETWORK DEFAULTS:

No Transparency:	Site cannot receive transparent transmissions. Transparent transmissions consist of control characters preceded by the DLE character (x'10').
No Padding:	EDS ELIT will NOT pad data blocks with 'pad' characters.
Format Code=02	Fixed length blocked records. Uncompressed.
Msg Rst=NO	If there is a line failure or transmission failure, the re-transmission will begin with the first message of the file. Combined with Max Msg=001, this will indicate the site is capable of receiving one file per transmission.

EDS ELIT LOCATION PROFILE FORM

Customer Code _____ (Leave Blank) **Date** _____

Company Name _____

Mailing Address _____

_____

_____

_____

(**LEAVE BLANK - INTERNAL USE ONLY**)	
Sponsoring Site	_____
Contact Name	_____
Phone	_____

Contact Name _____ **Phone** ( ) _____

Alternate _____ **Phone** ( ) _____

Fax # ( ) _____

This section required if you will connect DIRECTLY to EDS ELIT - NOT by external EDI VAN

Type of Connection: ASYNC ( ) BISYNC ( ) OTHER ( )

NOTE: If ASYNC is specified, no more data is required. If BISYNC, please complete next section.

Technical Information - BISYNC

MODEM SPEED (Please check ONLY one)

( ) **2400** ( ) **4800** ( ) **9600** bits per second

(201C Compatible) (208B Compatible) (V.32 Compatible)

PROTOCOL (Please check ONLY one)

( ) **2780** ( ) **3780**

MAXIMUM BLOCK SIZE: _____

(Minimum = 80, Maximum = 1000)

ELIT Network Defaults:

No Transparency

No Padding

Format Code = 02

Msg_Rst = NO & Max_Msg = 001

NOTES: _____

NOTE: If you have any questions regarding the completion of this form, your third party (or in-house) software representative should be able to assist you in completing the technical portion of it. If not, please refer questions to the EDS ELIT Corporate Support Group at (248) 265-8376.

Please return this completed form to:

Electronic Data Systems
ELIT Corporate Support Group
800 Tower Drive
4th Floor M/S 4126
Troy MI 48098

Or FAX the completed form to:

ELIT Corporate Support Group
FAX # (248) 265-3432

form dated 9/27/97

Initialization

Locations dedicated to data transmissions and not voice should normally operate their dial_up lines in an auto-answer mode, ready to receive data. Calls may be originated by manual or automatic dial, with immediate switching to data mode once the carrier signal has been audibly or electronically sensed. Locations with limited computer capacity should not be auto-dialed, but should dial a switching center and request all data destined for them. (See examples, pages 4 - 6)

Once the communications circuit has been physically established, the calling party should transmit the following character sequence to gain control of the communications line:

SYN SYN ENQ

This sequence is desired since the *HDR record verifies the calling station's ID. The sequence is desired since the *HDR record verifies the calling station’s ID. This is the most common line bid used today. This sequence contains no preceding ID sequence. To refresh your memory, it’s format is:

SYN SYN ENQ

Some locations may wish to send a line bid containing an identification sequence. This was used at one time to allow several types of bisync stations to operate on the same switched line. As technology has advanced it is rarely used today. If sent, ELIT will ignore the ID portion of the line bid. This methodology is (or was) known as “leading graphics”. If used, the format of a “leading graphics” line bid sequence would be:

SYN SYN X’C0’ X’C0’ ABC ENQ (where ABC is the sending location and X’C0’ refers to HEX C0)

The receiving party must respond to either sequence with:

ACK0

This exchange must be followed immediately with the log-on header from the calling party:

*HDRABC/password/new password

The "/ new password" is used only when calling party wishes to change its existing password. The very first password submitted by the calling party should appear in the old password field. The called party must now respond:

ACK1

After verifying that ABC is defined in the called party’s location table and has transmitted the proper password, we continue; otherwise, the called party will disconnect the circuit.

The calling party may try a maximum of five times in which an improper password is attempted. After five tries, the calling source destination code will be locked out until manual intervention is performed to reestablish that code in the called party’s location table.

At this point, with proper identification and password, the calling party may continue with a message starting with *THS or may invoke the line turnaround procedure.

If there is a problem with the password or any errors are found with the EDS ELIT headers, an EDIT FEEDBACK file may be built by EDS ELIT describing the problem or error. Refer to the Edit Feedback chapter for further information.

For those devices which must function with fixed block size records, the *HDR record may be padded to the fixed block size required by such devices. The absence of the " / " delimiter character will restrict the assignment of a new password consisting of the pad characters.

Passwords must be kept by both caller and calling party for all locations with which a station may communicate.

All locations will be required to change their password at least semi-annually and must be able to show evidence of when the password was changed. It is recommended that passwords be changed at least quarterly.

Each location that is called must check the calling location's password and verify that it has been changed within these guidelines. The transmission will be terminated if the established guideline is not followed.

Resetting Passwords

If a sending location is disconnected because of improper password and cannot make the proper correction within the five permissible attempts, the following procedure should be followed:

1. The sending station voice calls the receiving station and requests to be reinstated in the receiving station's table as a new sending location.
2. The receiving location should make a return voice contact to verify the identity of the requester.
3. Upon verification, the receiving location will reestablish the calling location as a new sender without an initial password.
4. Sender will logon to receiver with a new initial password.

Remember, the password should be five character, non-blank alpha numeric.

It should be noted that the verification voice contact in step 2 is essential to avoid compromise of the security system.

Audit trails must be maintained on all password changes by both sending and receiving locations.

Message Handling and Termination

After the initialization sequence has been exchanged, the called party is then prepared to receive data. The calling party then starts transmitting. When the calling party has completed the transmitting of data, he or she will send an EOT character. The EOT character will indicate to the called party that the caller has completed transmitting or had no data to send. At this point, the called party would send an ENQ sequence and receive an acknowledgment prior to sending any message.

Termination of the transmission is made after all messages have been sent. This is limited to one line turn around on any one connection. The termination request is the control sequence of DLE EOT.

Both calling and called parties should take into account the physical limitations of the other party based upon the Location Table data. All blocks should be padded, if necessary to correspond to the desired block size for fixed block size devices as noted in FORMAT CODES section. Similarly, the receiving location should expect padded headers, trailers, and data blocks from such fixed block length devices.

Reverse Interrupt Procedure

The Reverse Interrupt Control Character Sequence (RVI) can be sent by the party currently receiving a message to signal the transmitting party that transmission should be terminated at the end of the current message in process because a higher priority message must be sent by the current receiver. ELIT will support receipt of a RVI sequence but will not send one.

Message Sequence Numbers

A separate sequence number must be maintained for each physical location with which transmission is done. A new series should be started with "0001" at 2400 hours Eastern Standard Time.

The following procedure should be used to validate sequence numbers if you receive similarly named files:

Compare each new message sequence number to the previous sequence number received from this physical location. If the new number is higher than the previous, then check the date of the new message and the previous message. If the sequence number is one higher and the date is the same as the date of the previous message received, then the new message is in sequence. If the new sequence number is more than one higher, a message has been missed and either termination or operator notification is appropriate.

If the new message sequence number is equal or lower than the previous message sequence number, then determine if the date is the same. If the date is the same, then a duplicate message has been transmitted and either termination or special handling is appropriate. If the date of the new message is higher and the sequence number is "0001", then accept the message as being in sequence.

Every time a message is accepted it is necessary to retain the sequence number and the date.

This procedure will correctly handle the potential difficulty with different time zones and situations where a file is prepared for transmission late one day and actually transmitted early the next.

Restart and Recovery

Restart of aborted transmissions will be at a message level. Locations receiving messages on devices without message restart capability should provide a procedure to purge partially received messages. Furthermore, all locations receiving messages should be prepared to recognize suspected duplicate messages by analyzing the message sequence number. Switching centers detecting suspected duplicate messages must flag such messages in the Transmission Trailer Record (*TTR).

DEDICATED LINE CONTROL PROCEDURE

GENERAL

This section describes the line control discipline necessary to establish and maintain control of a point to point Binary Synchronous transmission facility. (may be known as a “dedicated line”)

The line control characteristics for data transfer, error checking and termination are the same as in the switched line environment and as described in the recommended appendix. The specific areas addressed by the dedicated line procedure are contention for the line and line turnaround. The term "master station" designates the transmitting terminal and "slave station" designates the receiving terminal.

LINE CONTENTION

When a BSC station has nothing to send, it will monitor the line for synchronization and the initialization sequence:
ENQ

Upon receiving this sequence, the BSC station will respond with a positive acknowledgment if ready;
ACKO

If the BSC station is not ready to receive, it responds with:
NAK or WACK

Assuming a positive acknowledgment, message reception may begin. When the last message has been sent by the master station, it will send the EOT sequence:
EOT

This causes the slave station to go into idle state. The master station will not send an initialization sequence before three seconds have elapsed, thus allowing the slave station to acquire the idle line. When a BSC station has a message for the remote BSC station, it will attempt to acquire the line by bidding. Bidding consists of sending an initialization sequence:
ENQ

There are three normal remote station responses to an initialization sequence. Normal responses should occur within a maximum of three seconds. If the remote station is ready to receive traffic, it will respond with the sequence:
ACK O

If the remote station is temporarily not ready to receive, it may respond with the sequence:
WACK

The BSC station shall repeat the ENQ sequence until the retry limit is reached. When the retry limit is reached, the BSC station will send the EOT sequence. If the remote station is not ready to receive, it may respond with the sequence:
NAK

The BSC station shall repeat the ENQ sequence until the retry limit is reached. When the retry limit is reached, the BSC station will send the EOT sequence. Assuming a successful line bid, the BSC station acquiring the line becomes the master station. The remote BSC station becomes the slave station.

*THD for Format Code 06

Description	Count	Positions
Start of Destination Indicator: the start of destination header will be the first item in the destination header and will identify the information to follow as a destination header.	*THD	1 - 4
Destination Code: the destination code will represent the location of the receiver to which the transmission is to be directed. If more than one destination is to be indicated, a separate destination header must be used to identify each destination.	3 alpha numeric	5 - 7
Record Format: RECFM of the original Data Set.	1 binary	8
Record Length: LRECL of the original Data Set.	2 binary	9 - 10
Block Size: BLKSIZE of the original Data Set.	2 binary	11 - 12
Data Set Organization: DSORG of the original Data Set.	1 binary	13
Member Name: The Member Name, if the data is from a member of a Partitioned Data Set (PDS).	8 alpha numeric	14 - 21
Data Set Name Suffix: The last 2 Levels of Qualification of the original Data Set Name.	17 alpha numeric	22 - 38
Number of Directory Blocks: Number of blocks in the directory of the PDS (if a PDS is being transmitted).	2 binary	39 - 40
Record Length: LRECL of "flat file" from IEBCOPY unload or IDCAMS export, if a PDS or a VSAM file is being transmitted.	2 binary	41 - 42
Block Size of PDS: BLKSIZE of "flat file" from IEBCOPY unload or IDCAMS export, if a PDS or a VSAM file is being transmitted.	2 binary	43 - 44
Record Format of PDS: RECFM of "flat file" from IEBCOPY unload or IDCAMS export, if a PDS or a VSAM file is being transmitted.	1 binary	45
Reserved	17	46 - 62
Original User ID (Optional): TSO User ID of the initiator of the file for transmission. If not used, must be blank.	8 alpha numeric	63 - 70
Recipient User ID (Optional): TSO User ID of the recipient user at the destination. Used for SYSOUT identification and/or user notification. If not used, must be blank.	8 alpha numeric	71 - 78
Last Destination Header Indicator: The 'commercial at' sign indicates the last Destination Header.	@	79
Reserved	1	80

OPTIONAL SERVICES

FEEDBACK

Upon user request, an EDS ELIT FEEDBACK FILE can be sent back to the original sender (source) after the successful unloading of a file at the final destination. A "feedback file" can also be sent back if the file becomes "HELD" or "CANCELED", which indicates an error has been detected at any EDS ELIT switcher the file passes through or at the final destination. This feature enables the original sender to determine if the file that was sent was successfully received and unloaded or was held because of an error condition. ELIT V5R0M5 supports a single record 128 byte FEEDBACK FILE while EDS ELIT V6R0M0 supports a double record 80 byte FEEDBACK FILE. (See below for details).

The FEEDBACK FILE feature is OPTIONAL and can be requested by the user by specifying a feedback filename in columns 60 - 69 in the *THS record. If necessary, refer to the EDS ELIT General Users Manual for further clarification regarding feedback.

EXCEPTION FEEDBACK

EXCEPTION FEEDBACK can be requested by simply adding the characters '$$' in the first two positions of the feedback filename plus the requested feedback filename. The feedback filename will be '$$feedbackfilename' supplied. A feedback file will only be returned when an error condition is detected.

EDS ELIT Feedback File - Single Record (V5R0M5)

Record #1

Description	Positions
Original File's Filename	1 - 10
Blank	11
Application Control Reference Number of the Original File	12 - 16
Blank	17
File Control Number of the Original File	18 - 26
Blank	27
Date of the Original File MM/DD/YY format	28 - 35
Blank	36
Time of the Original File HH:MM:SS format	37 - 44
Blank	45
Location Source Code of the Feedback File	46 - 48
Blank	49

Number of Records in the Original File	50 - 56
Blank	57
Status of the Original File	58 - 128

Example

TESTFILE99b*9707b000000123b07/04/97b12:34:56bZYXb0000567bFILE UNLOADED INTO DSN - ETBGMC0.TEST.DATA ("b" refers to a blank)

EDS ELIT Feedback File - Double Record (V6R0M0)

Record #1

Description	Positions
Original File's Filename	1 - 10
Blank	11
Application Control Reference Number of the Original File	12 - 16
Blank	17
File Control Number of the Original File	18 - 26
Blank	27
Date of the Original File MM/DD/YYYY format	28 - 37
Blank	38
Time of the Original File HH:MM:SS format	39 - 46
Blank	47
Destination of the Original File	48 - 64
Blank	65
Number of Records in the Original File	66 - 72
Blank	73
Location of Site Providing Feedback	74 - 76
Blank	77 - 80

Record #2

Description	Positions
Feedback Message	1 - 80

Example

ELITTEST01b**123b000000123b07/04/2001b11:12:13bZYXbbbbbbbbbbbbbbb45000bbbBDSbbbb
001-FILE UNLOADED INTO DSN-ETBGFF0.ELIT.SUPPORT

EDIT FEEDBACK

Please note that this feature is for BISYNC connections ONLY.

EDS ELIT will edit incoming BISYNC files for EDS ELIT header errors and will build an EDIT FEEDBACK file describing any errors found. When errors are encountered, EDS ELIT will attempt to finish editing remaining EDS ELIT headers before breaking the connection. If no errors are found with the EDS ELIT headers and trailers, the file will be processed normally.

The edit feedback file always has the filename EDITFEEDBK. All records are 80 bytes, fixed length. Text format feedback records contain the status (*WARNING, *REJECTED, *NOTE) of the incoming file. A status of *NOTE or *WARNING will provide a feedback message in the feedback record. A status of *REJECTED will provide the actual error message issued by ELIT and the message text to explain the error condition.

Requests to receive edit feedback files are controlled by the EDS ELIT location table of the site being contacted. An incoming BISYNC file can receive EDIT FEEDBACK if the site from which the file is being transmitted is specified as being eligible to receive EDIT FEEDBACK at the site being contacted. To receive EDIT FEEDBACK after a caller has been having problems transmitting a file to EDS ELIT, the caller should reconnect, send no files, and issue line turnaround immediately after receiving a response from the *HDR record. This procedure will retrieve the edit feedback file having the filename EDITFEEDBK. A caller who is having problems with the *HDR record (i.e., password problems) can still request line turnaround only and receive the feedback file. However, EDS ELIT will not transmit any other files to or from that location until the *HDR record problem is corrected. Also, warning messages (i.e., "password about to expire") will, if possible, be transmitted on the same connection.

Warning Format

Description	Positions
WARNING	1 - 9
Feedback Message	11 - 80

Rejected Format

Description	Positions
REJECTED FOR THE FOLLOWING ERROR CONDITION:	1 - 44
Error message from ELIT log	1 - 80

Note Format

Description	Positions
NOTE	1 - 9
Feedback Message	11 - 80

Warning Format Examples

*WARNING PASSWORD EXPIRES IN 12 DAYS
*WARNING NEW PASSWORD NOT ACCEPTED, SAME AS OLD PASSWORD

Rejected Format Example

*REJECTED FOR THE FOLLOWING ERROR CONDITION:
G272W-BN LINE02-PASSWORD RECEIVED FROM LOCATION ABC EXPIRED 15 DAYS AGO
Explanation: A password received from location ABC expired 15 days ago. The location is disconnected.

Note Format Example

*NOTE NO FILES TO DELIVER

SELECT FILES

General

EDS ELIT provides binary synchronous dial up users the ability to '*select*' the file(s) they wish to receive from those currently held in the ELIT subsystem to which they dial.

Dial up users who wish to utilize this facility must provide a '*SLCT' control record containing the filename(s) of the file(s) they wish to receive during this communication session. Optionally, the user can provide the source code of the original sender to further select particular file(s) to be received. This control record must immediately follow the Transmission logon record.

EDS ELIT V5R0M5 optionally allows for a 3 character Original Source Code to be entered as file selection criteria. (See below for specific record layouts).

EDS ELIT V6R0M0 optionally allows for an up to 17 character Original Source Code to be entered as file selection criteria plus the ability to NOT select a certain file while actually receiving all files except the specified filename. (See below for specific record layouts).

ELIT V5R0M5 *SLCT Control Record Layout

Description	Positions
*SLCT character constant used to specify which particular filename to be sent to the user and source.	1 - 5
Filename to be sent to the user.	6 - 15
Original source to be sent to the user. (Optional)	16 - 18
Reserved for future use (fill with spaces)	19 - 80

ELIT V6R0M0 *SLCT Control Record Layout

Description	Positions
*SLCT character constant used to specify which particular filename to be sent to the user and source.	1 - 5
Filename to be sent to the user.	6 - 15
One or more Filename/Source code combinations - use 1 blank to indicate no source code is involved in the selection. (See examples for details).	16 -80

*SLCT Examples

Example #1 (single filename, no source code)

Description	Positions
*SLCT	1 - 5
Filename (10 alpha numeric characters or less)	6 - 15
Blanks	16 - 80

Example #2 (Select ALL, except single filename)

Description	Positions
*SLCT	1 - 5
^ (NOT character)	6
Filename (10 alpha numeric characters or less)	7 - 16
Blanks	16 - 80

Example #3 (multiple filenames, no source code)

Description	Positions
*SLCT	1 - 5
Filename (10 alpha numeric characters or less)	6 - 15
Blank	16
Filename (10 alpha numeric characters or less)	17 - 26
Blank	27
Filename (10 alpha numeric characters or less)	28 - 37
Blanks	38 - 80

Example #4 (multiple filenames, single source code)

Description	Positions
*SLCT	1 - 5
Filename (10 alpha numeric characters or less)	6 - 15
Blank	16
Filename (10 alpha numeric characters or less)	17 - 26
Source Code (up to 17 characters)	27 - 43
Filename (10 alpha numeric characters or less)	44 - 53
Blanks	54 - 80

EDI DIRECT

General

EDS ELIT will allow users to send ANSI X12 ISA documents directly without having to wrap these documents in the standard ELIT headers. A logon header which contains a valid password is still a requirement to establish a connection. Either a *LOGONAIAG or *HDR logon header is permissible.

Users can send an ANSI X12 ISA document without sending the *THS ,*THD and *TTR records previously defined in this document. EDS ELIT will recognize these X12 records and attempt to verify the sender and receiver(s) specified. The sender and receiver(s) qualifier fields must be 'ZZ'. The sending and receiving locations must have valid location codes defined on the ELIT system. If the verifications are successful the file(s) will route normally through the ELIT network.

ELIT locations must be defined prior to the receipt of the X12 records and any necessary location code conversions will be handled internally. A filename may also be passed along in an ANSI X12 ISA record for use in the ELIT network. The filename should be contained in ISA record field ISA02 and a character '03' must be contained in the ISA record field ISA01. If a filename is not provided, EDS ELIT (V6R0M0) will default the filename to EDIDATA. In prior release of ELIT (V5R0M5) the filename defaulted to EDIDATAXXX, where XXX is the source location code.

*LOGONAIAG Record Layout (with example)

Description		Position
*LOGONAIAG	(R)	1 - 10
Logon version code (currently '01')	(R)	11 - 12
3 to 15 character ELIT Destination Location Code (left justified, blank filled)	(R)	13 - 27
3 to 15 character ELIT Source Location Code (left justified blank filled) (R)		28 - 42
Current Password (5 character alphanumeric, left justified blank filled)	(R)	43 - 52
Constant Delimiter '/' (only used when changing the password)		53
New Password (only used when changing the password, 5 character alphanumeric, left justified blank filled)		54 - 63
Not Currently used by EDS ELIT		64 - 67
Not Currently used by EDS ELIT		68
Required Filler (Blank filled)		69 - 79
Required Terminator character (*)	(R)	80

Example

LOGONAIAG01ABCbbbbbbbbbbbbXYZbbbbbbbbbbbbPSWRDbbb-- to col79 ("b" is blank)
LOGONAIAG01ABCbbbbbbbbbbbbXYZbbbbbbbbbbbbPSWRDbbbbb/NEWPWbbbbb-- to col79

SEND WITHOUT HEADERS

GENERAL

EDS ELIT provides outbound user exits to strip off the transmission headers normally associated with an EDS ELIT transmission to users who communicate via bisynchronous dial . This may be useful when communicating with third-party networks or individual users whose communication packages do not recognize the logon and / or transmission headers provided by the EDS ELIT network.

Users who wish to employ these features must have the exits 'turned on' in their EDS ELIT LOCATION CODES. If necessary, refer to the EDS ELIT General Users Manual, or contact EDS ELIT Administration for further assistance in specifying user exits.

ELIPOX01

User exit ELIPOX01 provides the capability of stripping off the transmission headers sent by EDS ELIT. When this exit is invoked the *HDR , *THS, *THD and *TTR transmission headers will NOT be sent.

ELIPOX03

User exit ELIPOX03 provides the capability of building a *LOGONAIAG logon header from the *HDR logon header normally provided by EDS ELIT.

REQUIRED FIELDS FOR HEADER AND TRAILER RECORDS

TRANSMISSION LOG-ON HEADER

Description	Content	Positions
Record Identifier	*HDR	1 - 4
Caller's Id	Caller's Location Code	5 - 7
Delimiter	/	8
Password	Determined by Caller	9 - 13

SOURCE HEADER

Description	Content	Positions
Record Identifier	*THS	1 - 4
Originator of File	Originator's Location Code	5 - 7
Sequence Number	0001	8 - 11
Format Code	02 (fixed length)	18 - 19
Record Length	Logical Record Length	20 - 23
Block Length	Transmission Block Length	24 - 27
Filename	Determined by Sender & Receiver	29 - 38
Continuation Number	01	39 - 40

DESTINATION HEADER

Description	Content	Positions
Record Identifier	*THD	1 - 4
Final Receiver of Data File	Final Receiver's Location Code	5 - 7
End of Header Indicator	@	79

MESSAGE TRAILER

Description	Content	Positions
Record Identifier	*TTR	1 - 4
Originator of File	Originator's Location Code	5 - 7
Sequence Number	0001	8 - 11
End of Data File Indicator	2	17
Format Code	(same as in *THS)	18 - 19
Block Length	(same as in *THS)	20 - 23
Next Location Code	location where file is directed or an intermediate switcher	32 - 34

GLOSSARY

ACK0, ACK1 (affirmative acknowledgment): These replies (DLE sequences) indicate that the previous transmission block was accepted by the receiving station and that it is ready to accept the next block of the transmission. Use of ACK0 / 1 alternately provides sequential checking control for a sequence of replies.

BSC (binary synchronous communications): A uniform procedure, using a standardized set of control characters and control character sequences for synchronous transmission of binary coded data between stations in a data communications system.

DLE (data link escape): A control character used exclusively to provide supplementary line-control signals (control character or DLE sequences). These are two character sequences where the first character is DLE. The second character varies according to the function desired and the code used.

ENQ (enquery): Used as a request for a response to obtain identification and / or an indication of station status. Transmitted as part of an initialization sequence (line bid) in a point-to-point operation.

EOT (end of transmission): Indicates the end of the transmission which may include one or more messages and resets all stations on the line to control mode. EOT is also transmitted as a negative response to a poll.

ETB (end of transmission block): Terminates a group of characters (transmission blocks) started with SOH or STX and indicates that the message continues with a following block. A message may contain one or more transmission blocks ending with ETB. The block check character (BCC) is sent immediately following ETB. ETB requires a reply indicating the receiving station's status.

ETX (end of text): Indicates the end of a message. If multiple transmission blocks are contained in the message, ETX terminates the last block of the message. (ETB terminates preceding blocks) The block check character is sent immediately after ETX. ETX requires a reply indicating receiving station's status.

NAK (negative acknowledgment): Indicates that the previous transmission block was in error and the receiver is ready to accept a re-transmission of the erroneous block. NAK is also a "not ready" reply to a station selection or to an initialization sequence (line bid) in a point-to-point operation.

PADDING: If the block size is larger than the record size, the block is "padded" with 9s (X'F9') to the end of the block.

RVI (reverse interrupt): Control character sequence (DLE sequence) sent by receiving station instead of ACK0 or ACK1 to request premature termination of the transmission in progress.

STX (start of text): Precedes a block of text characters.

SYN (synchronous idle): Character used as a time fill in the absence of any data or control character to maintain synchronization. The sequence of two continuous SYNs is used to establish synchronization (character phase) following each line turnaround.

WACK (wait before transmit positive acknowledgment): This DLE sequence is sent by the receiving station to indicate that it is temporarily unable to receive.

*HDR (logon header): Record identifying the source for security identification. Contains location code and password.

*THS (source header): Describes the nature of the source file, defining the blocking and record length values, plus other optional values.

*THS (destination header): Defines where the file should be delivered. (i.e., the final destination)

*TTR (message trailer header): Indicates the end of the message.